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SPECIFICATION AND CLAIMS

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LETTERS PATENT

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BATTERY POWERED FOOD STIRRER

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## BACKGROUND OF THE INVENTION

This invention relates to a food preparation appliance, and in particular to a portable, battery-operated food stirrer that is adapted to be used on a variety of different sized cooking vessels. The food stirrer is a cordless appliance with a housing containing a rechargeable battery.

The food stirrer of this invention is designed for use in the home, a restaurant, or a commercial cooking establishment for stirring sauces, broths, gravies, confections, and other temperature sensitive food preparations that customarily must be diligently monitored to prevent scorching or excessive thickening. Although the food stirring appliance of this invention may be an item of convenience for use in the home, in a restaurant kitchen or a commercial cooking establishment, the food stirrer can be an economic necessity. In the restaurant kitchen the concurrent preparation of the many different dishes and courses that go into a meal for many different diners creates a scheduling nightmare. The kitchen chef is unable to continually monitor the preparation of sauces and gravies that are being prepared. While an over-thickened sauce or gravy may be salvaged by thinning, if the sauce or gravy has been scorched, the taste is destroyed and the sauce must be discarded. Similarly, in the commercial cooking environment, often large vats or pots are used to prepare larger volumes of ingredients for prepared commercial foods. In such

situations, the burning of an ingredient such as a confectionery topping could cause an interruption in the production and serious delay in the scheduling of other steps in the processing.

Prior art stirring devices have been proposed. In  
5 Stevens, Patent No. 3,357,685 issued December 12, 1967, there is disclosed a battery-operated stirring unit for sauce pans and the like with a configuration of the general type proposed. The stirring unit of Stevens includes a housing containing a motor with a pair of adjustable yokes that seat on the top rim of a sauce pan. The yokes are adjustable in span to permit the stirring unit to be used on different sized pots or pans. The stirring unit includes an elongated adjustable shaft with a cross-bar having a series of depending stirring blades for contacting the bottom of the pan. The cross-bar allows adjustment of the blades for accommodating  
15 different diameter pots or pans. Rotation of the housing is prevented by downturned handles on the yokes which engage the handle or handles of the sauce pan or pot, functioning as a stop.

In Wells, Patent No. 5,332,310, issued July 26, 1994, a self-supporting house hold stirring appliance is disclosed. This  
20 device includes a four-paddle, stirring mechanism that contacts the bottom of the pan and provides the support for the housing containing the drive motor. The unit has an extending handle that projects outside the pan and contacts the handle of the pan to maintain the position of the stirring appliance. To center the

stirring appliance in the pan, the size of the paddles must be nearly identical to the size of the sauce pan. Each of the prior art units has certain disadvantages which has apparently inhibited wide spread use.

5           Although applicant contemplates that the unit described in this application may be provided in a commercial size and a household size, the design is suitable for a great variety of different sized pans and pots. The food stirrer of this invention has depending posts that contact the handle or handles of the vessel on which it is mounted in order to maintain its stationary position relative to its rotating paddle. However, because of the clamping action of the spring-loaded support arms, the appliance can be used on vessels without handles or handles positioned low on the vessel. Additionally, the support mechanism for mounting the food stirrer on a vessel is designed to provide self-centering, and to increase its grip as the sauce or other condiment thickens and paddle resistance increases. Furthermore, the specially designed paddle blades are useable on a range of different diameter pots and pans.

## SUMMARY OF THE INVENTION

5 The food preparation appliance of this invention comprises a battery-operated, food stirrer that is adapted to be utilized with a variety of different sized pots and pans. The  
invented appliance includes a housing having a motor with a power  
source and drive train to engage an elongated shaft having at its  
distal end a removable paddle. The paddle has two blades designed  
to contact the bottom and outside edges of the pot or pan on which  
the unit is seated. The shaft is axially displaceable in the  
housing allowing the unit to accommodate pots or pans of different  
depth. The housing includes a pair of pivotally connected support  
arms having end handles with depending engagement pegs for seating  
the appliance on the top rim of the pot or pan utilized. The shaft  
carrying the stirring blades depends from the center of the housing  
and contacts the bottom of the vessel. The paddle blades may be  
either of an expanding or contracting type to adjust to the  
diameter of the vessel in which the unit is utilized.

20 The unique design of the support arms with a spring-loaded connection to the body of the housing enables the unit to grip the top rim of the vessel and maintain the paddle shaft in a centralized position. As the blades of the paddle encounter resistance, the torque is applied to the housing and transmitted to the arms which, because of their offset position, lock onto the outer rim of the vessel. In this manner, the arrangement of the

support arms aid in maintaining the housing body in its stationary position while the paddle rotates. While the arms include depending posts to prevent pivot of the housing by contact with the handles or handle of the vessel the unit is useable on vessels without handles or on vessels where the handles are mounted low on the pot or pan.

To eliminate the use of a power cord, the food stirrer is battery powered and includes a compact battery that drives the drive motor operably connected to the drive train. The DC drive motor and reduction gears of the train are designed to rotate the paddle at approximately 4 revolutions per minute, providing a slow stirring action. Additionally, the blades of the paddle are preferably designed to scoop the food composition from the outer portion of the vessel and fold the food over into the inner portion. In this manner a constant slow mixing as well as stirring occurs. The unique design of the support arms of the housing and the stirring blades of the paddle enables the food stirrer appliance to be utilized on vessels that are from nine inches to sixteen inches in diameter. As noted, a larger commercial unit is scaled to accommodate vessels of correspondingly larger size. These and other features will become apparent from a detailed description of the preferred embodiments that follow.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of the food stirrer of this invention.

FIG. 2 is an alternate stirrer paddle for the food stirrer of FIG. 1.

FIG. 3 is an exploded view of the food stirrer of FIG. 1.

FIG. 4 is a top view of the food stirrer of FIG. 1 with the stirrer paddle of FIG. 2 on a large cooking vessel.

FIG. 5 is a top view of the food stirrer of FIG. 1 with the stirrer paddle of FIG. 2 on a small cooking vessel.

## DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The food preparation appliance of this invention comprises a food stirrer and is shown in the drawings and designated generally by the reference numeral 10. The food stirrer 10 comprises a battery-operated, portable device, that is adapted for a variety of different sizes of pans and pots. The device has been primarily designed to slowly stir sauces, gravies, confectioneries and other food compositions that are easily scorched and ordinarily would require constant monitoring. The food stirrer appliance 10 is used on both sauce pans and cooking pots which together with other such cooking containers are designated as cooking vessels in this specification. The food stirrer appliance 10 has one or more replaceable stirring paddles of which two types are shown in FIGS. 1 and 2. The preferred paddle ~~12~~ is shown in FIG. 1 and an alternate paddle is shown in FIG. 2. by the reference numerals <sup>12</sup>~~12a~~ and <sup>12a</sup>~~12b~~, respectively.

Referring to FIG. 1, the food stirrer 10 includes a housing 14 that contains the drive mechanism for the elongated shaft 16 that is connected at its distal end to the stirring paddle 12. Operation of the stirring paddle 12 is activated by a on-off switch 18 mounted in the top of the housing 14. An alternate type of stirring paddle is shown in FIG. 2, and designated by the reference numeral 12a. The housing 14 includes two pivotally connected support arms 20 and 22 which are each equipped with an



integral handle 24 for lifting the appliance and seating the food stirrer onto the top of a cooking vessel, as shown in FIGS. 4 and 5.

Referring to the exploded view of FIG. 3, the housing 14 has a top portion <sup>25</sup>~~24~~ and a bottom portion 26 which when coupled forms a body 27 with a main cavity 28 for containing the drive mechanism 30. The drive mechanism 30 is in part seated on a support plate 32 and includes a drive motor 34 and a gear train 36. The gear train 36 provides a rotation reduction from the drive shaft 38 of the motor to the square stirrer shaft 16. The stirrer gear 40 that engages the shaft 16 includes a sleeve 42 rotably seated in a bearing sleeve 43 that in turn is seated in a bearing mount 45 on the support plate 32. The shaft 16 is slidably engaged in the sleeve 43 of the stirrer gear 40 allowing adjustment of the effective length of the shaft from the housing to the stirring blade 12. The shaft 16 extends through a hole 44 in the top portion of <sup>25</sup>~~24~~ of the housing 14 as shown in FIG. 1. The distal end 46 of the shaft 16 includes a nock 48 that frictionally engages an internal bead (not shown) in the hub 50 of the paddle 12. A similar arrangement is utilized for the alternate type of paddle 12a as shown in FIG. 2. The drive mechanism 30 is assembled and the support plate 32 is secured into the cavity 28 by screws 52.

Powering the drive motor 34 is a power source 54 which in the preferred embodiment comprises a 12 volt, rechargeable battery

55. The battery 55 seats in the cavity 28 and is electrically connected to the drive motor 34. The power source 54 has a conventional electric circuit (not shown) that includes a fuse unit 56 and charge jack 57 that are installed into the bottom portion 26 of the housing 14. As an auxiliary item, the appliance includes a low-battery warning light 58 to signal that the battery is low and needs recharging, and an adjustment <sup>knob</sup>~~nob~~ 60 for varying the speed of the motor within a limited range using a simple potentiometer. The gear train 36 is selected to reduce the revolutions of the motor 34 to an output of approximately 4 revolutions per minute for the stirring paddle 12 or 12a. The speed can be adjusted within a range, for example, from 2-8 revolutions per minute by the adjustment knob 60. A conventional mechanical timer 61 mounted in the housing can signal a set time has past.

The housing 14 also includes a pair of side compartments 62 having pivot pins 64 which engage pivot bearings 66 at the end of the support arms 20. In order to bias the support arms 20 in the contracted minimal position as shown in FIG. 1 and FIG. 5, a coil spring 70 is contained within the side compartment 62 with one end of the spring 70 engaging the housing and the other end engaging the pivot end of the support arm 20. The pivot 66 is trapped within the side compartments 62 when the top portion 24 and bottom portion 26 are assembled and secured with screws 72.

The <sup>stirring</sup>~~steering~~ paddles 12 and 12a are designed with

flexible blades 74 and 74a. The paddle 12 shown in FIG. 1 and 2 has elongated, curved blades 74 which are designed to be bowed inwardly to conform to a pot or pan with a diameter less than the span of the unconfined paddle 12.

5           Conversely, the curved blades 74a of the alternate paddle 12a are initially contracted and expand by flexing as the blades 74a contact and displace the food composition in the bottom of the vessel.

As shown, the paddles 12 and 12a may have different blade configurations. The blades 74 of paddle 12 have a wide end portion 76 with a narrower inner portion 78. This provides a stirring action that scoops the food composition from the outer portion of the pan and folds it over into the inner portion, where it moves outwardly until encountering the following blade. At each tip 80 of the blades 74 are beads 82 which function as a bearing against the bottom wall of the vessel.

The blades 74a of the alternate paddle 12a, are substantially of the same width and as noted expand to the diameter of the vessel during operation. Depending on the action desired the width can differ on replacement paddles (not shown).  
A           Optionally, the tip 80a may include a bead<sup>82a</sup> of the type shown for the paddle 12 of FIG 1.

Referring to the drawings the food stirrer 10 is designed to seat on a large vessel 84 as shown in FIG. 4 or a small vessel 86 as shown in FIG. 5, or by adjustment of the spring-biased arms 20, any intermediate vessel.

5           The positioning of the arms, being off-set from a radial from the stirring shaft 16, results in the torque developed at the counter-clockwise blade being directed to the arms in an axially clockwise direction. This action tends to contract the arms and supplements the bias of the coil springs 70 to increase the frictional grip of depending contact posts 88 at the distal ends of the arms 20. The contact posts 88 engage the outer rim 90 of the vessels 84 and 86. Any slippage of the post on the rim is limited when the post contacts the handle or handles of the vessel. An additional peg 92 on the opposite side of the handles 24 from the post 88 provides a stop for small vessels to protect the depending portion 94 of the handles 24 from contact with the vessel. When the vessel has no handle or has handles mounted low on the vessel, the frictional grip of the posts can be improved by use of a rubber-like sleeve 96, as shown in FIG. 3, on the upper portion of each post.

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In operation the appropriate paddle is attached to the end of the shaft and the appliance seated on the cooking vessel by expanding the arms using the handles. The shaft is adjusted to seat the paddle on the bottom of the vessel. When the food stirrer

is then turned on, any minor off-center positioning is self-corrected as the contact pegs further grip the outer rim by the torsional action of stirring as described. Rotational speed can be adjusted by the control knob with a timing reminder signaled by the mechanical timer. The housing and paddles are fabricated of food-grade plastic with the stirrer shaft fabricated from food-grade stainless steel. The battery is rechargeable using a standard D.C. charger.

While, in the foregoing, embodiments of the present invention have been set forth in considerable detail for the purposes of making a complete disclosure of the invention, it may be apparent to those of skill in the art that numerous changes may be made in such detail without departing from the spirit and principles of the invention.